WHAT IS CLAIMED IS:

1. A method comprising the steps of:

(a) suspending a quantity of functionalized carbon nanotubes in a solvent to form a suspension of functionalized carbon nanotubes; and

(b) heating said suspension to a temperature that will thermally defunctionalize the functionalized carbon nanotubes yielding a defunctionalized product.

2. The method of Claim 1, wherein the carbon nanotubes are selected from the group consisting of single-wall carbon nanotubes (SWNTs), multi-wall carbon nanotubes (MWNTs), double-wall carbon nanotubes, semiconducting carbon nanotubes, metallic carbon nanotubes, semi-metallic carbon nanotubes, chiral carbon nanotubes, buckytubes, carbon fibrils, and combinations thereof.

3. The method of Claim 1 or 2, wherein the solvent is thermally stable at the temperatures required for defunctionalization.

4. The method of Claims 1-2, or 3, wherein the solvent is selected from the group consisting of o-dichlorobenzene, benzene, toluene, water, sulfuric acid, oleum, sulfuric acid with dissolved potassium persulfate, liquid ammonia, liquid ammonia with dissolved alkali metals, alkanes, parafins, thiophene, and combinations thereof.

5. The method of Claims 1-3, or 4, wherein the suspension is completely enclosed in a vessel.

6. The method of Claims 1-4, or 5, wherein the suspension further comprises a polymeric species.

7. The method of Claims 1-5, or 6, wherein the suspension further comprises a surfactant.

8. The method of Claims 1-6, or 7, wherein the defunctionalized product is selected from the group consisting of unfunctionalized carbon nanotubes, partially functionalized carbon nanotubes, and combinations thereof.

9. The method of Claims 1-7, or 8, wherein the defunctionalized product is functionally uniform.

10. The method of Claims 1-8, or 9, wherein the defunctionalized product is resuspendable in a solvent.

11. The method of Claims 1-9, or 10, wherein the functionalized carbon nanotubes are selectively defunctionalized according to different (n,m) types, said types displaying differential propensity for defunctionalization.

12. A method comprising the steps of:

(a) dispersing a quantity of functionalized carbon nanotubes in a polymer matrix to form a first blended material comprising functionalized carbon nanotubes in a polymer host; and

(b) heating said first blended material to a temperature that will thermally defunctionalize the functionalized carbon nanotubes with the polymer host to yield a second blended material comprising defunctionalized or partially defunctionalized carbon nanotubes in a polymer host.

13. The method of Claim 12, wherein the carbon nanotubes are selected from the group consisting of single-wall carbon nanotubes (SWNTs), multi-wall carbon nanotubes (MWNTs), double-wall carbon nanotubes, semiconducting carbon nanotubes, metallic carbon nanotubes, semi-metallic carbon nanotubes, chiral carbon nanotubes, buckytubes, carbon fibrils, and combinations thereof

14. The method of Claim 12 or 13, wherein the defunctionalized carbon nanotubes are selected from the group consisting of unfunctionalized carbon nanotubes, partially functionalized carbon nanotubes, and combinations thereof.